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Nuisance Alarms in Aircraft Cargo Areas and Critical Telecommunications Systems: Proceedings of The Third NIST Fire Detector Workshop

William L. Grosshandler
Editor

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Gaithersburg, Maryland 20899

United States Department of Commerce
Technology Administration
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Technology Administration
Gary R. Bachula, *Acting Under Secretary for Technology*
National Institute of Standards and Technology
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EXECUTIVE SUMMARY

The need for faster and more intelligent decision making regarding the presence or absence of a fire threat has become acute in the commercial aircraft and telecommunications industries, both of which have been particularly hard-hit by the cessation of halon production. The drive toward earlier detection has as a consequence the possibility of increased rate of nuisance alarms; however, there are no accepted standards against which a fire detection system can be operated to assess its immunity to false alarm. A workshop was held at NIST with the main objective to identify physical sources of nuisance alarms that may plague current and emerging fire detection technologies for telecommunications applications and for aircraft cargo areas, to reach consensus on what test methods are appropriate to evaluate a detection system's immunity to false alarm in the presence of physical nuisance sources, and to recommend actions to develop and/or implement these new test methods. The workshop consisted of a number of invited background talks from representatives of the aircraft and telecommunications industries and government agencies. The current state of detector evaluation methodologies was reviewed, along with what has been documented in the open literature regarding the number and sources of nuisance/false alarms in these two applications. Groups were formed from among the participants to discuss relevant issues, followed by open deliberations in an attempt to arrive at a consensus. Among the topics were defining realistic fire threats and simulating them; documenting existing environments; simulating environments that lead to false alarms; determining requirements of the industry with regard to the tolerable rate of nuisance alarms; and examining current operating practices as a means to identify opportunities to reduce false alarms. This report summarizes the discussions and presents the major findings for each application.

Key recommendations for both the airlines and telecommunications industries include the following:

- Develop consensus on what constitutes "acceptable" performance for new classes of detection systems, including the fire threats to be detected as specified by fuels, geometry, rates of heat release, smoke generated, and times to detection.

- Compile background data from currently installed fire detection systems to account for the number of fire incidents, the number and major sources of nuisance alarms and the associated actions and costs, and to establish the range of conditions normally encountered in the non-fire state.

- Expand capabilities to simulate common environmental nuisance sources including relative humidity, condensation, dust, combustion engine exhaust gases, and soldering operations, and develop protocols to evaluate detection systems exposed to these environments.

- Investigate methods for evaluating and certifying proprietary software to ascertain its ability to discriminate a fire from a non-fire state in the presence of nuisance background sources.

- Develop safe, convenient, and scientifically sound techniques to certify detection systems as installed in the field.

(Note that the authorship of this report is diffuse, but the major contributors to each section are noted. The editor has heavily paraphrased the statements of the contributors, but also has taken the liberty to fill in or expand to improve continuity or understanding for the reader.)

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